

**I/WE CLAIM:**

1                   1.       A method for transmitting information in a Mobile Internet Protocol  
2 (IP) network including a mobile node (MN), a base station (BS) and a home network,  
3 wherein a proxy mobile node (PMN) and a foreign agent (FA) are provided at the BS, and  
4 a home agent (HA) is provided at the home network, the method comprising the steps of:

5                   the MN detecting the BS;

6                   the PMN identifying the MN;

7                   the PMN retrieving an IP address for each of the MN, FA and HA;

8                   the PMN sending a registration request to the FA;

9                   the FA relaying the request to the HA;

10                  the HA registering the proxy MN identified with the MN;

11                  the HA forwarding Mobile IP packet to the FA by encapsulating the  
12 information into at least one Mobile IP packet;

13                  the FA unencapsulating the forwarded IP packet into original data; and

14                  the FA forwarding the original data to the MN.

1                   2.       The method of claim 1 further comprising the steps of:  
2                   determining whether a new base station (BS) including a new proxy mobile  
3 node (PMN) is detected;

4                   if it is determined that a new base station is detected,

5                   (a)     the new PMN sending a new registration request to a new foreign

6 agent (FA) associated with the new BS;

7 (b) the FA relaying the new registration request to the HA;

8 (c) the HA registering the new proxy MN; and

9 (d) the HA forwarding the Mobile IP packet to the new FA.

1 3. The method of claim 2 further comprising the step of acknowledging  
2 the registration of step (c).

1 4. The method of claim 1 wherein the MN comprises customer premise  
2 equipment (CPE) and a computer.

1 5. The method of claim 4 wherein the CPE comprises at least one of  
2 a wireless radio, personal digital assistant (PDA) and a mobile telephone, T1 line, cable  
3 modem, digital subscriber line (DSL) and asymmetric digital subscriber line (ADSL)  
4 modem.

1 6. The method of claim 1 further comprising the step of storing  
2 additional information for the PMN in a database wherein the additional information  
3 comprises:

4 a home address which is an IP address of the MN;

5 a foreign agent IP address which is an IP address of the FA;

6 a home agent IP address which is an IP address of the HA;

7 a care-of address which is an IP address for a destination for the  
8 information;

9 mobile-foreign security information which is a security association between  
10 the MN and the FA;

11 mobile-home security information which is a security association between  
12 the MN and the HA;

13 an identification field value for matching registration requests and  
14 acknowledgments;

15 a lifetime value for a number of seconds allowed from the registration  
16 before the registration is considered expired; and

17 a current lifetime value for a number of seconds remaining before the  
18 registration is considered expired.

1 7. A Mobile Internet protocol (IP) network comprising:

2 a home network;

3 a home agent (HA) provided at the home network;

4 a base station (BS) broadcasting a pilot signal;

5 a foreign agent (FA) provided at or associated with the BS;

6 a mobile node (MN) providing an ability to detect and identify itself to a BS;

7 and

8 a proxy mobile node (PMN) identifying the MN wherein the proxy MN is  
9 provided at the BS;

10                    wherein the PMN respectively retrieves an IP address for each of the MN,  
11                    FA and HA and sends a registration request to the FA, the FA relays the registration  
12                    request to the HA, and the PMN is registered with the HA if the PMN identifies the MN,  
13                    so that the MN functionality is provided transparently to the MN by the PMN.

1                    8.        The network of claim 7 further comprising:  
2                    a new base station (BS);  
3                    a new foreign agent (FA) associated with the new BS;  
4                    a new proxy mobile node (PMN) provided at the new BS;

5                    wherein the new PMN retrieves an IP address for each of the MN, the new FA, and the  
6                    HA and sends a new registration request to the new FA, the new FA relays the new  
7                    registration request to the HA, and the new PMN is registered with the HA via the new  
8                    FA if the MN detects the new BS.

1                    9.        The network of claim 7 wherein the MN comprises customer premise  
2                    equipment (CPE) and a computer.

1                    10.       The network of claim 9 wherein the CPE comprises at least one of  
2                    a wireless radio, personal digital assistant (PDA) and a mobile telephone, T1 line, cable  
3                    modem, digital subscriber line (DSL) and asymmetric digital subscriber line (ADSL)  
4                    modem.

1                   11.    The network of claim 7 further comprising a database storing  
2   additional information for the proxy MN wherein the additional information comprises:  
3                   a home address which is an IP address of the MN;  
4                   a foreign agent IP address which is an IP address of the FA;  
5                   a home agent IP address which is an IP address of the HA;  
6                   a care-of address which is an IP address for a destination for the  
7   information;  
8                   mobile-foreign security information which is a security association between  
9   the MN and the FA;  
10                  mobile-home security information which is a security association between  
11   the MN and the HA;  
12                  an identification field value for matching registration requests and  
13   acknowledgments;  
14                  a lifetime value for a number of seconds allowed from the registration  
15   before the registration is considered expired; and  
16                  a current lifetime value for a number of seconds remaining before the  
17   registration is considered expired.